Before the
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ON

BROADBAND STUDY CONDUCTED BY THE BERKMAN CENTER FOR INTERNET AND SOCIETY

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* The views expressed here are those of the author and not necessarily those of the TPI board, fellows, or staff.

Introduction and Summary of Comments

These comments are submitted in response to the Commission's request regarding the broadband study conducted by the Berkman Center for Internet and Society.

[1] The announced purpose of the Berkman study is to provide "an independent expert review of existing literature and studies about broadband deployment and usage throughout the world [in order to] help inform the FCC's efforts in developing the National Broadband Plan."[2] These comments do not constitute a comprehensive assessment of the Berkman study. They do, however, demonstrate that the study is limited in the literature it reviews and that some of the best economic research in this area reaches conclusions at variance with Berkman's claims.

In its request for comments, the Commission asks six questions including:[3]

- Does the study accomplish its intended purposes?
- Does the study provide a complete and objective survey of the subject matter?
- How much weight should the Commission give to this study as it develops a National Broadband Plan?

My review indicates that the study is incomplete and not objective; therefore it does not accomplish its intended purpose. The Commission should give little if any weight to this study as it develops its National Broadband Plan. Indeed, if the Commission acts on the study's recommendations, it will adopt measures that are likely to inhibit broadband deployment.

The Berkman study's principal conclusion is that open access policies have been successful around the world and that the U.S. should adopt such policies in order to improve its broadband

[1] "Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy From Around the World," Berkman Center for Internet & Society at Harvard University, October 2009 draft.

[2] "Harvard's Berkman Center to Conduct Independent Review of Broadband Studies to Assist FCC" news release. http://www.fcc.gov/Daily_Releases/Daily_Business/2009/db0714/DOC-291986A1.pdf

[3] NBP Public Notice #13. http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-2217A1.pdf.

performance. However, the study ignores important contributions to the literature by prominent telecommunications scholars that don't support this conclusion. Some of those contributions make the following points:

- Although the United States is not at the top of worldwide broadband penetration rankings, we are in relatively good shape. This is contrary to the picture painted by the Berkman study. In fact, the U.S. is behind the leaders in broadband penetration by only a matter of months. At current trends, we are likely to reach 80 percent household penetration in 2011. This is the penetration level for Korea, which ranks number 1, and is probably at or close to the saturation level. Thus, even if the open access policies recommended by the study were effective (and the evidence suggests they are not), by the time they were implemented we would have little need for them.

- The Berkman study continues to rely on penetration per capita as a useful measure of broadband performance, in part because the authors have calculated that per capita and per household penetration are highly correlated. However, this will not continue to be the case. As household penetration levels converge over time, there will be little correlation between per capita and per household measures. Moreover, as penetration increases, the per capita rank of countries with large household sizes will decline; this explains why Korea's rank has fallen from first to sixth. Scott Wallsten, currently Economics Director at the Commission's National Broadband Task Force, has shown that when all households in all countries are connected, the U.S. will rank 18th among OECD countries in terms of per capita penetration. Policy makers should not rely on this demonstrably flawed measure.

- The Berkman study does not discuss any of the extensive analysis undertaken of the U.S. experience with unbundling requirements under the 1996 Telecom Act. A well-known study by Brookings economist Robert Crandall shows that the U.S. unbundling experience was not successful. In light of this, it is incumbent on anyone recommending a new unbundling regime to show why the new one would succeed where its predecessor did not.

- The section on country case studies ignores the results of a study by MIT economist Jerry Hausman and Gregory Sidak that examines the unbundling experiences in five countries and finds that mandatory unbundling did not achieve its intended results in any of these countries.

- The empirical section ignores a detailed published econometric study by Wallsten that finds that mandatory unbundling adversely affects investment in next-generation (i.e., fiber) networks and that platform competition is positively correlated with such investment. Thus, adopting the Berkman study's recommendations would retard deployment of next-generation networks, contrary to the goals of a National Broadband Plan.

The Status of Broadband in the United States

The Berkman study presents a morass of data on broadband penetration, capacity, and prices and comes to the conclusion that, "the United States is, overall, a middle-of-the-pack performer" with respect to broadband.[4] It concludes that, in order to emerge from the middle-of-the-pack, the U.S. needs to learn from the practices of other countries which are doing better.

The picture presented by the study, both in terms of where we are and what is needed, is misleading, in part because broadband markets are changing so rapidly. U.S. household broadband penetration increased from 47 percent in March 2007 to 63 percent in April 2009 according to surveys by the Pew Internet and American Life Project. Whether the U.S. ranks 15th in household penetration, as estimated by the Berkman study,[5] or between 8th and 10th, as estimated in a recent paper by Scott Wallsten,[6] the U.S. is behind the leaders in broadband penetration by only a matter of months.

Wallsten suggests that Korea, at about 80 percent household penetration, is probably at a saturation point that will be difficult to exceed.[7] He estimates that, at current trends, the U.S. will reach that point sometime in 2011.[8]

The Berkman study continues to view penetration per capita as a useful measure, despite persuasive evidence that it is misleading. As a matter of arithmetic, countries with large household size will tend over time to rank low in the per capita rankings. Korea has slipped from first to sixth place because it has relatively large average family size. Wallsten calculates

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[4] Berkman Center, p. 67.

[5] The Berkman report (pp.31-32) finds that the U.S. ranks about 15th on both a per capita and a per household basis

[6] Scott Wallsten, "Understanding International Broadband Comparisons, 2009 Update," Technology Policy Institute, June 2009. The Wallsten paper, which is not cited in the Berkman study, can be found at http://www.techpolicyinstitute.org/files/understanding%20international%20broadband%20comparisons%202009%20update%207-9.pdf

[7] Presumably the saturation level can be affected by measures the National Broadband Task Force is likely considering to increase deployment in unserved and underserved areas and increase demand for broadband.

[8] Wallsten, p. 3.

that if 100 percent of the households in every country were connected, the U.S. would rank 18th among OECD countries (in per capita terms) and much lower relative to all countries because of differences in household size. He warns that "Policymakers interested in measuring the effectiveness of policies intended to improve broadband in this country should take note: because the U.S. per capita rank will ultimately decrease over time, any policy will appear to fail if success is measured by per capita rank."[9] Because of the speed at which broadband penetration is increasing, this could well happen within the tenure of current officials.

The Berkman study maintains that penetration per capita and per household are highly correlated—the authors have estimated the correlation coefficient to be 0.82—suggesting that two measures can be used interchangeably. However, this may simply be an accident of the time period we are in currently. As household penetration levels of different countries converge, the correlation coefficient will become smaller. If, for example, all countries have the same household penetration level, there will be no correlation between per capita and per household penetration levels—the correlation coefficient will be zero.

Finally, Wallsten points out that regardless of our international rankings, the overall quality of broadband in the U.S., including available speeds, is high. This is reflected in the fact that Americans are the biggest consumers of online music and video, according to data from Ofcom. Consumers in the U.S. download a far larger share of their music and video purchases than consumers in other countries studied.[10] Faster speeds are not an end in themselves; they are only important insofar as they are used to access technologically demanding content and services. The U.S. appears to be a world leader in this regard.

United States' Experience with Mandatory Unbundling

The Berkman study gives only brief mention to the U.S. unbundling experience, noting that "While Congress adopted various open access provisions in the almost unanimously-approved

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[9] Wallsten, p. 2.

[10] The countries include Canada, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, and the United Kingdom.

Telecommunications Act of 1996, the FCC decided to abandon this mode of regulation for broadband in a series of decisions in 2001 and 2002."[11] "Resistance by incumbents and skepticism by the courts meant that the unbundling provisions of the 1996 Telecommunications Act were largely stillborn; certainly in their application to the emerging broadband market."[12]

In fact, the U.S. experience with unbundling was extensive and it was not positive. While the U.S. experience dealt mostly with entrance into local telephone markets, the lessons are highly relevant to the broadband market. Why the Berkman study chose to essentially ignore the U.S. experience with open access, which is well documented, is unclear.

The U.S. unbundling experience has been analyzed in detail in a study by Brookings Institution economist Robert Crandall.[13] The 1996 Act required incumbent carriers to provide entrants access to their unbundled facilities at regulated rates. The rates were based on the forward-looking costs of building new facilities—total element long-run incremental cost (TELRIC). These rates themselves were difficult to estimate and varied considerably by state. Any unbundling scheme faces the problem of establishing regulated rates for these unbundled facilities—an issue that the Berkman study also does not discuss.

Crandall's findings include:

- Entrants were able to resell the entire UNE platform at low TELRIC rates. "As a result, by the end of 2003 nearly two-thirds of all entrants' lines reflected little more than resale of the incumbents' services."[14]

- Few of the competitive local exchange carriers (CLECs) that entered during 1996-2002 survived and many of the survivors were forced into bankruptcy.[15]

[11] Berkman Center, p. 11.

[12] Berkman Center, p. 83.

[13] Robert W. Crandall, *Competition and Chaos, U.S. Telecommunications Since the 1996 Telecom Act*, Brookings Institution Press, 2005

[14] Crandall, p. 37.

[15] Crandall, p. 47.

- There were no net welfare benefits in the residential market and total net welfare benefits of only $0.8 billion in 2003. The cost of conveying those benefits included the capital costs, which Crandall conservatively estimates at $8 billion a year, plus marketing and administrative costs, which were much higher for entrants than for incumbents.[16]

- The CLECs were a drag on productivity growth in the industry because they were simply reselling incumbents' services.

Crandall concludes:

> In short, most of the cost of the 1996-2003 exercise in promoting local entry must at this point be written off as a failed experiment. This is not to say that competition will not emerge or has not emerged. Rather, the competitors induced into the marketplace through 2003 by regulatory incentives designed to encourage resale in one form or another have not generated benefits that can justify their huge investments in facilities, start-up costs, and marketing expense.[17]
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> The FCC no doubt attempted to implement the 1996 act with the best of intentions, hoping that its liberal "interconnection" policy would encourage sustainable entry. In fact, a large number of entrants did appear, investing at least $55 billion in capital facilities. Eight years later, few of these entrants remain viable. Entry has not reduced subscriber rates measurably, nor has it provided a notable increase in services. Local competition seems to be settling down to a battle between the incumbents, the cable television companies, and the wireless carriers.[18]

Crandall also reviews the regulatory experience with broadband and concludes:

> Unfortunately, most of the past nine years have been spent debating how to "open up" the telephone companies' networks to competitors incapable of building or unwilling to build their own facilities and how to provide ISPs with access to cable platforms. Most of the new local entrants are either mired in bankruptcy or nearly so, and the smaller ISPs are disappearing anyway. Equally important, the incumbent Bell companies slashed capital expenditures between 2000 and 2002, despite the fact that about 30 percent of households and small businesses were still unable to receive DSL service.
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> In 2003 the FCC decided to sharply reduce the degree of line sharing and unbundling required of incumbent telephone companies. This decision appears to

[16] Crandall, p. 56.

[17] Crandall, p. 57.

[18] Crandall, p. 58.

> have reversed the decline in Bell-company planned capital expenditures, at least temporarily, and has led the Bell companies to reduce DSL prices and roll out service to heretofore unserved areas. In turn, cable television systems have responded by increasing the speed of their cable modem services. Broadband subscriptions have been increasing rapidly and may now accelerate in response to the lower prices.[19]

Case Studies

The Berkman study describes the experiences of a number of countries but does not incorporate any of the case studies that do not support its conclusions. For example, although the study references a paper by Hausman and Sidak in a footnote, it doesn't discuss their major conclusion—that unbundling failed to achieve any of its goals in any of the five countries studied.[20]

Mandatory unbundling in the five countries studied by Hausman and Sidak—the United States, United Kingdom, New Zealand, Canada, and Germany—failed to produce:

- Lower prices and greater innovation, as might be expected from greater retail competition;
- Facilities-based competition, as predicted by the "stepping-stone" or "ladder of investment" hypothesis; or
- More wholesale competition.

Hausman and Sidak also found that the mandatory unbundling experience did not support the view that retail competition could not be achieved without mandatory unbundling. In fact, significant facilities-based competition—from cable and wireless providers—has emerged independent of mandatory unbundling.

[19] Crandall, p. 131-132.

[20] The study is referenced at p. 110, fn. 83 of the Berkman study. See Jerry A. Hausman and J. Gregory Sidak, "Did Mandatory Unbundling Achieve Its Purpose? Empirical Evidence From Five Countries," *Journal of Competition Law and Economics* 1(1), 173-245, 2005.

Econometric Analysis

On the basis of its econometric analysis, the Berkman study concludes that unbundling has had a positive effect on broadband penetration. However, the study failed to review the most up-to-date published study of the effect of mandatory unbundling on broadband investment. In a study published in the March 2009 *Review of Network Economics*, Scott Wallsten and Stephanie Hausladen estimated the effect of unbundling and platform competition on investment in next generation networks using data from 27 European countries from July 2002 to July 2007.[21]

Wallsten and Hausladen found that there is a negative relationship between unbundling and investment in next generation networks:

- There is a negative correlation between the number of unbundled lines per capita—either unbundled loops or bitstream—and the number of fiber connections per capita. An increase in the number of unbundled lines is associated with fewer fiber broadband connections.
- This negative correlation holds for both entrants and incumbents.
- The negative correlation holds across other platforms as well. There is a negative correlation between the number of unbundled loops and the number of broadband connections over cable, wireless local loops, as well as DSL provided over the entrants' own facilities. (The relationship between bitstream unbundling and these other variables is not statistically significant.)

Wallsten and Hausladen also found a positive relationship between platform competition and investment in next generation networks:

- The number of fiber connections (per capita) provided by entrants is positively related to the number of DSL lines they offer over their own facilities. When entrants rely on unbundling to provide DSL, they are less likely to invest in their own fiber connections.

[21] See Scott Wallsten and Stephanie Hausladen, "Net Neutrality, Unbundling, and their Effects on International Investment in Next-Generation Networks," *Review of Network Economics* 8(1), 90-112, March 2009. This paper can be found at http://www.techpolicyinstitute.org/files/wallsten_unbundling_march_2009.pdf

- The number of fiber connections (per capita) provided by incumbents is positively correlated to the number of cable broadband connections provided by entrants. Thus, incumbents respond to competition from cable by increasing investment in fiber.

All of this is good news for the United States. We have substantial platform competition and we do not at present have an unbundling regime. These results indicate that adopting an unbundling regime would retard investment in next-generation networks.

Conclusion

The Commission asks in its request for comments how much weight it should give the Berkman study as it develops a National Broadband Plan. My review of the relevant literature suggests the Commission should give the study little if any weight.

The Berkman study's principal finding is that open access policies have been virtually universally successful. But the study does not accurately reflect what is known about the effects of mandatory unbundling regulation. It fails to incorporate important studies that find that such policies have been unsuccessful and costly, and that mandatory unbundling would adversely affect investment in next-generation networks. Thus, relying on the Berkman study would produce policies that are opposite to the goals of the National Broadband Plan.